CLAIMS

1. A conjugate for gene transfer, comprising an oligonucleotide intended to be transferred into a target cell and a hydrophilic polymer, wherein an end of the oligonucleotide is covalently linked to the hydrophilic polymer.

2. The conjugate as set forth in claim 1, wherein the hydrophilic polymer is selected form non-ionic polymers having a molecular weight of over 500 daltons.

3. The conjugate as set forth in claim 1, wherein the oligonucleotide has a molecular weight ranging from 1,000 to 50,000 daltons.

4. The conjugate as set forth in claim 1, wherein the hydrophilic polymer is one or more selected from the group consisting of polyethylene glycol, polyvinylpyrrolidone and polyoxazoline.

5. The conjugate as set forth in claim 1, wherein the oligonucleotide is linked to the hydrophilic polymer via one linkage selected from the group consisting of non-cleavable linkages including amide bond and carbamate linkage, acid-cleavable linkages including hydrazone bond, phosphoroamidate linkage and acetal bond, disulfide bond, ester bond, anhydride-cleavable linkage, and enzyme-cleavable linkage.

6. The conjugate as set forth in claim 1, wherein monomers of the oligonucleotide are linearly linked via one of a phosphodiester bond, phosphorothioate linkage, phosphoroamidate linkage and an amide bond.

7. The conjugate as set forth in claim 1, wherein the oligonucleotide is an antisense oligonucleotide, peptide nucleic acid or small interference RNA

(siRNA).

8. The conjugate as set forth in claim 7, wherein the antisense oligonucleotide comprises a portion or entire nucleotide sequence of one gene selected from c-myc, c-myb, c-fos, c-raf, c-ras c-src or c-jun genes.

9. A method of synthesizing a conjugate for gene transfer, comprising the steps of activating an end of an oligonucleotide, and covalently linking a biodegradable hydrophilic polymer to the end of the oligonucleotide.

10. The method as set forth in claim 9, wherein a chemical compound activating a functional group at the end of the oligonucleotide is selected from 1-ethyl-3,3-dimethylaminopropyl carbodiimide (EDAC), imidazole, N-hydrosuccinimide (NHS) and dicyclohexylcarbodiimide (DCC), HOBt (1-hydroxybezotriazole), ρ-nitrophenylchloroformate, carbonyldiimidazole (CDI), and N,N′-disuccinimidylcarbonate (DSC).

11. A polyelectrolyte complex micelle formed from the conjugate for gene transfer of any one of claims 1 to 8 and a cationic polymer or cationic peptide, wherein formation of the micelle is driven by ionic interaction.

12. The polyelectrolyte complex micelle as set forth in claim 11, wherein cationic peptide is KALA or protamine.

13. The polyelectrolyte complex micelle as set forth in claim 11, wherein cationic polymer is one or more selected from polyethylenimine, polyamidoamine, polylysine, diethylaminoethyldextran, polydimethylamino-ethyl methylacrylate, and derivates thereof.

14. A method of preparing a polyelectrolyte complex micelle,

comprising inducing ionic interaction between the conjugate for gene transfer of any one of claims 1 to 8 and a cationic polymer or cationic peptide.